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ABSTRACT

The purpose of this experimental study was to determine the effects of interactive video versus traditional lecture on cognitive learning and affective behaviors of undergraduate nursing students. It was hypothesized that there would be no significant differences in the cognitive achievement scores of students taught by an interactive videodisk program as compared to those of students taught by a traditional lecture method, but that statistically significant differences would be obtained between the two groups of students in their attitude toward learning. Eighty-three third-year nursing students at a major urban university were the subjects for the study. The topic of health assessment of the patient with diabetes was taught during one week of a nursing course. Students in the control group attended traditional lectures and those in the experimental group learned about the same topic using an interactive videodisk. Both groups read the same readings. A pretest posttest design was used, and control and experimental groups were compared on each of two dependent variables--cognitive achievement and attitude toward learning. The achievement measure was based on content and objectives of the learning unit and selection of test items was made by experienced nursing faculty. Attitude was measured using the Attitude Toward CAI (Computer-Assisted Instruction) Semantic Differential Tool. Both hypotheses were confirmed. While no significant differences in cognitive achievement between the two groups was found, a statistically significant difference between the two groups on their attitude toward learning was found, reflecting research indicating that students respond favorably to interactive video technology. (GL)

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THE EFFECTS OF INTERACTIVE VIDEO ON COGNITIVE ACHIEVEMENT AND ATTITUDE TOWARD LEARNING

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Objectives and Theoretical Framework

Interactive videodisc programs have been touted to be the ... "most effective delivery systems yet for education and training" (Stewart, 1987, Chap 13, p. 1). According to Miller (1987), "The greatest promise of interactive media lies in the opportunity to recapture through technology the one-on-one relationship that can efficiently respond to individual learning styles" (p. 2). This medium utilizes a multisensory approach which incorporates the use of sound and motion video as well as computer text and graphics. This fusion of video and computer technology results in programs in which the user's actions, choices and decisions affect the way the program proceeds. Interactive media permits individualized instruction by allowing the learner to determine the content to be learned and the length of time needed to learn the program material.

DeBloois, Maki, and Hall (1984) stated that for the first time a technology exists which allows instructional designers to more appropriately match instruction to the individual's learning characteristics, and which requires learner involvement. Even though interactive videodisc programs are deemed an effective means of education, there is little research investigating the impact of this technology on the learning process. Hannafin (1986) wrote that most published research in the area has focused on ... "prescribing 'how-to's', case studies describing the particular techniques and procedures employed during a given project and, of course, the sweeping, often unsubstantiated claims for effectiveness" (p. 101). The research reported in this study contributes to the literature on the impact of interactive video in the classroom by investigating the effects of interactive video on students' cognitive achievement and attitude toward learning.

Cognitive, affective, and pragmatic concerns were identified as future research variables to be studied with interactive video (Hannafin, Phillips, and Tripp, 1986). There are only a few studies which have empirically tested these concerns. In one study evaluating cognitive achievement gains, Smith, Jones, and Waugh (1986) designed interactive computer-assisted videodisc laboratory simulations for a group of 103 students enrolled in a general chemistry course. They concluded that student performance on reports ($p = .0068$) and test scores ($p = .0005$) were significantly better for students who used videodiscs for instruction as compared to those who did not.

Another study addressing cognitive concerns was conducted by Edwards and Hannah (1985) to determine the effectiveness of an interactive videodisc system in teaching cardiopulmonary resuscitation (CPR) in the lay community. The experimental group was taught CPR with the videodisc while the control group was taught by the traditional instructional method. A lack of statistically significant differences between the groups led the authors to conclude that the interactive videodisc teaching method was just as effective as the traditional CPR instructional method.

Dalton (1986) addressing both cognitive and affective concerns, compared learning and attitudes toward learning with video computer-assisted instruction (CAI), and interactive video. The results were that CAI and interactive video groups scored significantly

higher on a posttest than the video group ($p < .01$). On the attitude survey, the interactive video group scored significantly higher than either of the other groups ($p < .005$).

In a follow-up to the Edwards and Hannah (1985) study, Aukerman (1986) additionally investigated affective concerns of 57 registered nurses through a quasi-experimental design which compared a CPR interactive video program with a traditional instructional method. Significant findings included: a two-to-one preference for the interactive video method, and 87 percent reduction in instructor time, and an 11 percent reduction in participant time to learn the same content equally well.

Another study using the previously mentioned CPR videodisc conducted by the County College of Morris (Stewart, 1987) indicated very positive attitudes about videodisc learning. All students indicated that the most valuable aspect of videodisc learning was the ability to learn at one's own pace, 98 percent would be willing to recommend the course to others, and 90.3 percent would take another interactive video course if offered.

In summary, while there is a paucity of empirical evidence on interactive videodisc learning, the existing literature identifies two trends. They are that cognitive gains with interactive videodisc learning either equal or exceed the gains with the traditional teaching method and attitude surveys demonstrate that students favor the interactive video method of learning over the traditional method.

The purpose of this experimentally-designed study was to determine the effects of interactive videodisc versus traditional lecture on cognitive learning and affective behaviors of baccalaureate nursing students. It was hypothesized that: (1) there would be no significant differences in the cognitive achievement scores between those students taught by an interactive videodisc program as compared to those students taught by a traditional lecture method, and (2) statistically significant differences would be obtained between those students taught by an interactive videodisc program as compared to students taught by a traditional lecture method in their attitude toward learning.

Method

Subjects

Eighty-three third-year nursing students at a major urban university served as subjects for this study. These students were mostly women, in their twenties, who were currently pursuing a bachelor of science in nursing. They were enrolled in a course which the content included care of the patient with diabetes. Students were randomly assigned to either a control or an experimental group. There were 41 students in the control group and 42 in the experimental group.

Procedure

A pretest-posttest design was used. The control and experimental groups were compared on each of the dependent variables, cognitive achievement and attitude toward learning. The topic of health assessment of the patient with diabetes was taught during one week of the course. The control condition approximated traditional instruction where the instructor lectured on the topic and students were assigned to read relevant information outside of class. In the experimental condition, students learned about the same topic using an interactive videodisc and read the same relevant information as the control group. Under this condition students were required to respond to questions posed by the videodisc thus interacting in the learning process.

The study was conducted over a one-week period. The control group met once during the week for a period of 90 minutes during which the instructor lectured on the topic. Students in this group were expected to read about the topic in a variety of courses outside of class. The experimental group did not meet for classroom instruction and, instead, they individually viewed the videodisc at their own convenience. Students in this group were also expected to read about the topic in the same readings as the control group.

The instructor for the control group was a woman faculty member with 20 years of teaching experience, and had taught health assessment previously. As part of the course, all students in the study were instructed on how to use the videodisc program by a trained media staff member.

Instrumentation

In this study the variables of interest were cognitive achievement and attitude toward learning. Cognitive achievement was the level of learning exhibited by students on pre and posttests. The achievement measure was based on the content and objectives of the learning unit. Selection of test items was made by several experienced nursing faculty. Only items for which full agreement had been reached by these faculty were included in the tests.

Students' attitude toward learning was the feeling students had concerning the learning of the topic. Attitude was measured by the Attitude Toward CAI semantic differential tool, consisting of 14 bipolar adjective scales each measured on a seven-point scale, prior to and at the conclusion of the study. Cronbach's alpha coefficient of internal consistency reliability for this scale is reported as .853 for undergraduates (Allen, 1986).

Results and Conclusions

A multivariate analysis of covariance with two criteria and the pretest as the covariate was performed on the data. Univariate analyses for each of the separate criteria were also performed following the multivariate analysis.

The multivariate analysis covariance was significant ($p = .000$, $df = 4$, 140) indicating that the adjusted post-test scores on the two measures were significantly different for the experimental group as compared to the control group. The univariate F for the cognitive measure was nonsignificant ($p = .283$, $df = 2$, 72) indicating that students' achievement under interactive video is not significantly different than under traditional lecture. The univariate F for the affective measure was significant ($p = .000$, $df = 2$, 72) indicating that the students learning by interactive video possessed a more positive attitude toward learning than those learning by traditional instruction.

The expectation that there would not be significant differences between the two groups on cognitive achievement was met. This belief stems from the current literature which has shown achievement under interactive videodisc instruction to be at least as effective as traditional lecture. Yet interactive videodisc learning benefits other noncognitive aspects of learning such as attitude toward learning. Furthermore, it provides additional time for the instructor to work with students on an individual basis.

The expectation that there would be significant differences between the two groups on their attitude toward learning was met. Research has indicated that students respond favorably to interactive media technology. It appears that the format for learning with videodiscs allows students to learn at their own pace, to go back over material they are unsure about, and to learn through several senses -- visually, auditorially, and tactically. Visual learning occurs as students view the video instruction, auditory learning occurs as students hear the video instruction, and tactile learning occurs as students use the computer keyboard to respond to the video instruction.

Educational Importance

While there is much agreement that interactive video has tremendous potential for classroom learning, little research has been conducted to investigate its' effects on classroom learning. This study is innovative because it provides empirical evidence documenting how interactive video impacts on the learning process.

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